AMENDMENTS TO THE CLAIMS

1.-12.   (Canceled).

13.   (New) An apparatus for estimating a level of spectral whitening to be applied to a signal prior to a high-frequency regeneration step or after the high-frequency regeneration step to be performed when generating a high-frequency regenerated signal having a highband which is based on a lowband signal, wherein the spectral whitening is obtained by filtering using a spectral whitening filter, the spectral whitening filter being an adaptive filter being adaptable by means of a filter parameter, the apparatus comprising:

an estimator for estimating a tonal character of an original signal to be encoded, at a given time, wherein the original audio signal is to be encoded by an audio coder to obtain an encoded audio signal representing only a lowband of the original audio signal, the estimated tonal character including an estimated tonal character of a highband of the original audio signal, which is not included in the encoded audio signal;

a determinator for determining a varying filter parameter of the spectral whitening filter based on the estimated tonal character; and

an associator for associating the varying filter parameter to the encoded audio signal to obtain a bit stream having the encoded

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audio signal having the varying filter parameter, the varying filter parameter being dependent on the encoded audio signal.

14. (New) The apparatus in accordance with claim 13, wherein the high-frequency regeneration step is such that it does not substantially alter a tonal structure of the lowband,

the estimator is arranged such that in addition to the tonal character of the highband, a tonal character of the lowband is also determined, and

the determinator is arranged for comparing the tonal character of the highband and the tonal character of the lowband to determine the filter parameter.

15. (New) The apparatus in accordance with claim 13, further comprising:

a performer for performing the high-frequency regeneration step on the lowband of the original audio signal to obtain the high-frequency regenerated signal; and

a further estimator for estimating a tonal character of the high-frequency regenerated signal,

wherein the determinator is arranged for comparing the high-frequency regenerated signal and the highband of the original audio signal for determining the filter parameter.

16.   (New) The apparatus according to claim 13, wherein the estimator is arranged for estimating the tonal character of the original signal for different frequency regions.

17.   (New) The apparatus according to claim 13, wherein the estimator is arranged for estimating the required amount of spectral whitening for different frequency regions.

18.   (New) The apparatus according to claim 13, wherein the spectral whitening to be applied to a signal prior to a high-frequency regeneration step or after the high-frequency regeneration step is performed in the time domain.

19.   (New) The apparatus according to claim 13, wherein the spectral whitening to be applied to a signal prior to a high frequency regeneration step or after the high-frequency regeneration step is performed in a subband filterbank.

20.   (New) The apparatus according to claim 13, wherein the estimator is arranged to estimate a required amount of spectral whitening by comparing tonal to noise signal ratios of different subband signals obtained from subband filtering of the original signal, where the ratios are obtained using linear prediction of the subband signals.

21. (New) The apparatus according to claim 13, wherein the estimator is arranged to estimate a required amount of spectral whitening by comparing tonal to noise signal ratios of different subband signals obtained from subband filtering of the original signal and said high frequency reconstructed signal, where the ratios are obtained using linear prediction of the subband signals, and the high frequency reconstructed signal is produced in the same manner as the high frequency reconstructed signal in a decoder.

22. (New) The apparatus according to claim 13, wherein the spectral whitening filter is a filter having filter coefficients obtained by linear prediction to obtain a linear predictive coding (LPC) polynomial, and in which the filter parameter indicates a predictor order of the LPC polynomial, a bandwidth expansion factor of the LPC polynomial or a blending factor indicating an amount of mixing a filtered signal and an unprocessed counter part.

23. (New) The apparatus according to claim 19, wherein the estimator is arranged to perform a linear predictive coding (LPC) estimation, and in which the estimator is arranged to perform a pre-filtering in the LPC estimation to compensate for characteristic of filterbank analysis filters of the subband filterbank.

24. (New) An apparatus for producing an output signal based on a decoded version of an encoded audio signal representing a lowband of an original audio signal, the encoded audio signal having associated therewith a varying filter parameter for a spectral whitening filter, the varying filter parameter depending on a tonal character of a highband of the original audio signal at a given time, the apparatus comprising:

a demultiplexer for obtaining the varying filter parameter associated with the encoded audio signal;

a high-frequency reconstructor for performing a high frequency reconstruction step on a decoded version of the encoded audio signal to produce a high-frequency reconstructed signal; and

an adaptive spectral whitening filter for filtering the decoded version or the high-frequency regenerated signal;

wherein the adaptive spectral whitening filter has a variable parameter, the variable parameter being set in accordance with the varying filter parameter associated with the encoded audio signal.

25. (New) The apparatus in accordance with claim 24, wherein the adaptive spectral whitening filter comprises:

a windower for windowing the to be filtered signal;

a linear predictive coder for obtaining a linear predictive coding (LPC) polynomial of a windowed signal, the linear predictive

coder being responsive to an LPC order and a bandwidth expansion factor as varying filter parameters for a given time; and

a finite impulse response (FIR) filter for filtering the to be filtered signal, the FIR filter being set by the LPC polynomial obtained by the linear predictive coder.

26. (New) A method for estimating a level of spectral whitening to be applied to a signal prior to a high-frequency regeneration step or after the high-frequency regeneration step to be performed when generating a high-frequency regenerated signal having a highband which is based on a lowband signal, wherein the spectral whitening is obtained by filtering using a spectral whitening filter, the spectral whitening filter being an adaptive filter being adaptable by means of a filter parameter, the method comprising:

estimating a tonal character of an original audio signal to be encoded, at a given time, wherein the original audio signal is to be encoded by an audio coder to obtain an encoded audio signal representing only a lowband of the original audio signal, the estimated tonal character including an estimated tonal character of a highband of the original audio signal, which is not included in the encoded audio signal;

determining a varying filter parameter of the spectral whitening filter based on the estimated tonal character; and

associating the varying filter parameter to the encoded audio signal to obtain a bit stream having the encoded audio signal having the varying filter parameter, the varying filter parameter being dependent on the encoded audio signal.

27. (New) Method for producing an output signal based on a decoded version of an encoded audio signal representing a lowband of an original audio signal, the encoded audio signal having associated therewith a varying filter parameter for a spectral whitening filter, the varying filter parameter depending on a tonal character of a highband of the original audio signal at a given time, the method comprising the following steps:

obtaining the varying filter parameter associated with the encoded audio signal;

performing a high-frequency regeneration step on a decoded version of the encoded audio signal to produce a high frequency regenerated signal; and

filtering the decoded version or the high-frequency regenerated signal using an adaptive spectral whitening filter;

wherein the adaptive spectral whitening filter has a variable parameter, the variable parameter being set in accordance with the varying filter parameter associated with the encoded audio signal.

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28. (New) An encoder for encoding an original audio signal to obtain an encoded version thereof, comprising:

an apparatus for estimating a level of spectral whitening to be applied to a signal prior to a high-frequency regeneration step or after the high-frequency regeneration step to be performed when generating a high-frequency regenerated signal having a highband which is based on a lowband signal, wherein the spectral whitening is obtained by filtering using a spectral whitening filter, the spectral whitening filter being an adaptive filter being adaptable by means of a filter parameter, the apparatus comprising:

an estimator for estimating a tonal character of an original signal to be encoded, at a given time, wherein the original audio signal is to be encoded by an audio coder to obtain an encoded audio signal representing only a lowband of the original audio signal, the estimated tonal character including an estimated tonal character of a highband of the original audio signal, which is not included in the encoded audio signal;

a determinator for determining a varying filter parameter of the spectral whitening filter based on the estimated tonal character; and

an associator for associating the varying filter parameter to the encoded audio signal to obtain a bit stream having the encoded audio signal having the varying filter

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parameter, the varying filter parameter being dependent on the encoded audio signal;

an audio encoder for encoding the original audio signal to obtain the encoded version thereof;

an estimator for estimating a spectral envelope of the original audio signal to obtain an estimated spectral envelope; and

a multiplexer for multiplexing the encoded version of the original audio signal, the filter parameter of the spectral whitening filter and the estimated spectral envelope for obtaining a bit stream.

29. (New) A decoder for decoding a bit stream including an encoded version of an original audio signal, an estimated spectral envelope and a filter parameter to be applied to a spectral whitening filter, the decoder comprising:

a bit stream demultiplexer for extracting the encoded version of the original audio signal, the estimated spectral envelope and the filter parameter;

an audio decoder for decoding the encoded version of the original audio signal to obtain a lowband signal;

an envelope decoder for decoding the estimated spectral envelope;

an apparatus for producing an output signal based on a decoded version of an encoded audio signal representing a lowband of an

original audio signal, the encoded audio signal having associated therewith a varying filter parameter for a spectral whitening filter, the varying filter parameter depending on a tonal character of a highband of the original audio signal at a given time, the apparatus comprising:

a demultiplexer for obtaining the varying filter parameter associated with the encoded audio signal;

a high-frequency reconstructor for performing a high frequency reconstruction step on a decoded version of the encoded audio signal to produce a high-frequency reconstructed signal; and

an adaptive spectral whitening filter for filtering the decoded version or the high-frequency regenerated signal, wherein the adaptive spectral whitening filter has a variable parameter, the variable parameter being set in accordance with the varying filter parameter associated with the encoded audio signal; and

a summer for summing an adaptively spectral whitened high frequency regenerated signal and a delayed version of the decoded audio signal to obtain a wideband output signal.

30. (New) Method for encoding an original audio signal to obtain an encoded version thereof, comprising the following steps:

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estimating a level of spectral whitening to be applied to a signal prior to a high-frequency regeneration step or after the high-frequency regeneration step to be performed when generating a high-frequency regenerated signal having a highband which is based on a lowband signal, wherein the spectral whitening is obtained by filtering using a spectral whitening filter, the spectral whitening filter being an adaptive filter being adaptable by means of a filter parameter, the step of estimating including:

estimating a tonal character of an original audio signal to be encoded, at a given time, wherein the original audio signal is to be encoded by an audio coder to obtain an encoded audio signal representing only a lowband of the original audio signal, the estimated tonal character including an estimated tonal character of a highband of the original audio signal, which is not included in the encoded audio signal;

determining a varying filter parameter of the spectral whitening filter based on the estimated tonal character; and

associating the varying filter parameter to the encoded audio signal to obtain a bit stream having the encoded audio signal having the varying filter parameter, the varying filter parameter being dependent on the encoded audio signal;

encoding the original audio signal to obtain the encoded version thereof;

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estimating a spectral envelope of the original audio signal to obtain an estimated spectral envelope; and

multiplexing the encoded version of the original audio signal, the filter parameter of the spectral whitening filter and the estimated spectral envelope for obtaining a bit stream.

31. (New) A method for decoding a bit stream including an encoded version of an original audio signal, an estimated spectral envelope and a filter parameter to be applied to a spectral whitening filter, the method comprising:

extracting the encoded version of the original audio signal, the estimated spectral envelope and the filter parameter;

decoding the encoded version of the original audio signal to obtain a lowband signal;

decoding the estimated spectral envelope;

producing an output signal based on a decoded version of an encoded audio signal representing a lowband of an original audio signal, the encoded audio signal having associated therewith a varying filter parameter for a spectral whitening filter, the varying filter parameter depending on a tonal character of a highband of the original audio signal at a given time, the step of producing comprising:

obtaining the varying filter parameter associated with the encoded audio signal;

performing a high-frequency regeneration step on a decoded version of the encoded audio signal to produce a high-frequency regenerated signal; and

filtering the decoded version or the high-frequency regenerated signal using an adaptive spectral whitening filter, wherein the adaptive spectral whitening filter has a variable parameter, the variable parameter being set in accordance with the varying filter parameter associated with the encoded audio signal; and

summing an adaptively spectral whitened high-frequency regenerated signal and a delayed version of the decoded audio signal to obtain a wideband output signal.